HLA C2 Experiment
Status Report

Presented to:

DMSO Architecture Management Group

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Outline

- Experiment Overview
- Key Objectives
- System Architecture Specification
- Approach
- Status / Issues

Experiment Overview

- An experiment exploring the development of HLA federations consisting of constructive simulations interacting with real-world C2 entities.
- Extension of the JTFp (consisting of NASM/ AP, NSS, Eagle and Federation Controller) by adding three real-world C2 federates (CTAPS, AFATDS, MCS/P) interfaced to the federation via the MRCI.

Experiment Participants

AGENCY	ROLE	POC
DMSO	Activity Lead	Maj Steve Zeswitz
JSIMS	Testbed, Admin.	Dave Pratt, Bill Hudgins
ESC	Air Warfare	Tim Rudolph, Tony Luches
TRAC	Land Warfare	Kent Picket, Jack Ogren
SPAWAR	Naval Warfare	Les Parish, Bill Stevens
NRaD	MRCI / C2	Tom Tiernan, Cindy Keune
AEgis	System Integ.	Bill Waite, Mike Lightner

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HLA C2 Experiment
Key Objectives

- **HLA Processes**
  - » **Assessing FEDEP & extending experience base**
  - » **Extension of existing Federation & Federates**
  - » **Assessing impact of C4I on HLA federations**
  - » **Assessing the Federation Security Engineering Process (FSEP)**

HLA C2 Experiment
Key Objectives

- **HLA & MRCI**
  - » **Assessing impact on federates of federating with real-world C4I entities**
  - » **Assessing what it requires to make C2 system an HLA federate**
  - » **Assessing adequacy of C2 DIF (CCSIL)**
  - » **Assess MRCI functionality**

HLA C2 Experiment
Key Objectives

- **Federation Management & Tools**
  - » **Assess and provide feedback on MOM compliant Federation Controller & prospects for a reusable federation controller**
  - » **Demonstrate and assess use of MOM features in collecting data and managing federation**
  - » **Use of OMDT - assess & provide feedback**
  - » **Assessing where automated tools could support FEDEP & defining requirements for such tools**

HLA C2 Experiment
Key MRCI Aspects

- Assessing basic premise of MRCI
- First good test case for MRCI
- First case of interacting with Naval entities
- Assessing the design of MRCI with respect to modularity and reconfigurability

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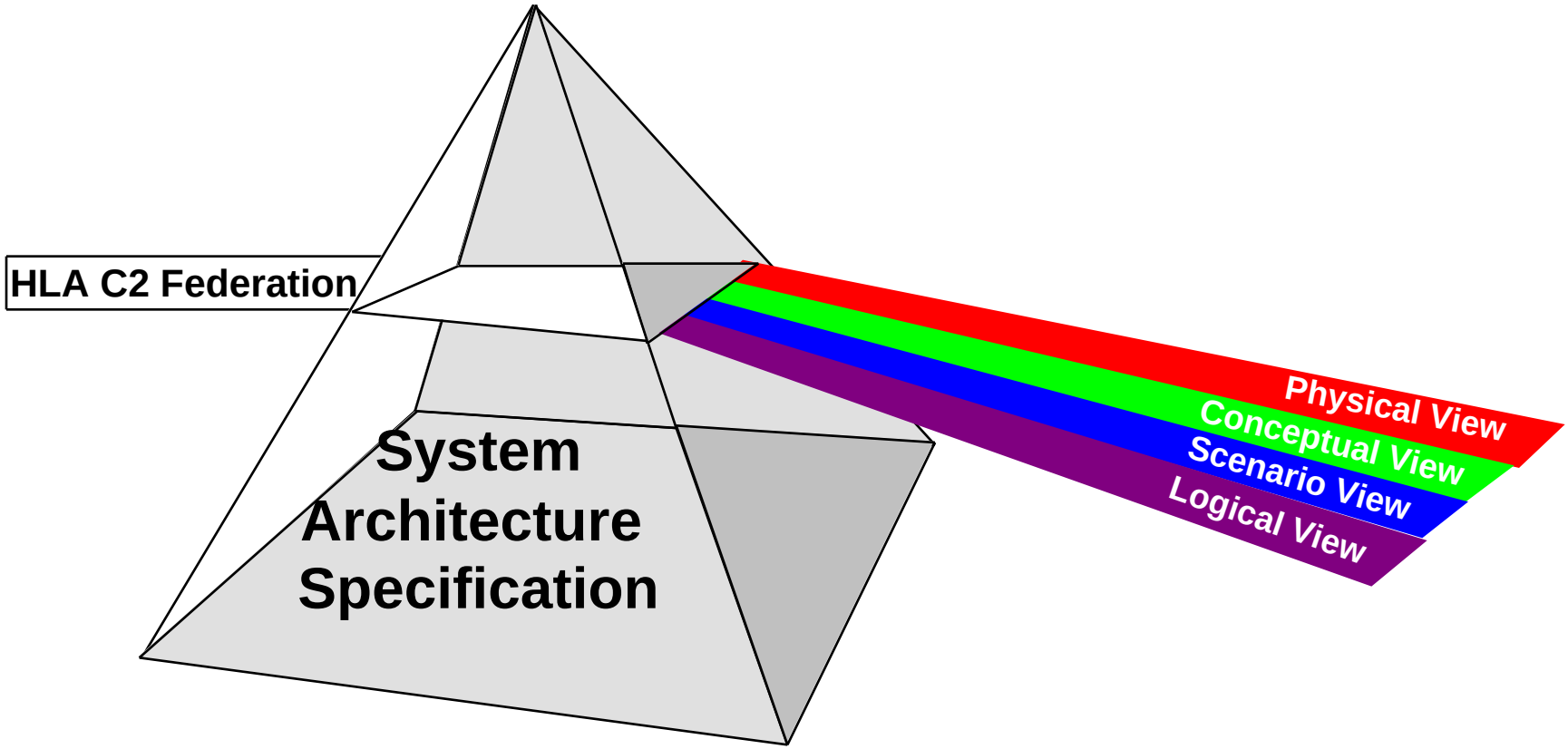
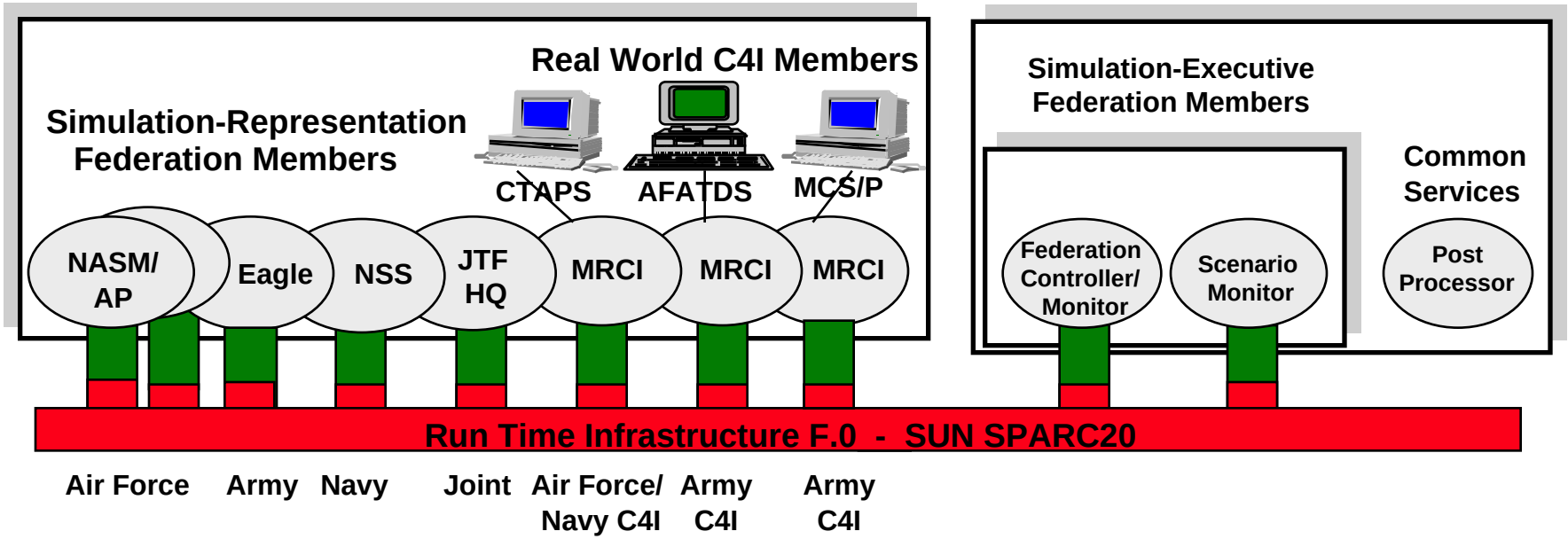
System Architecture Specification



System Architecture Specification

Physical View

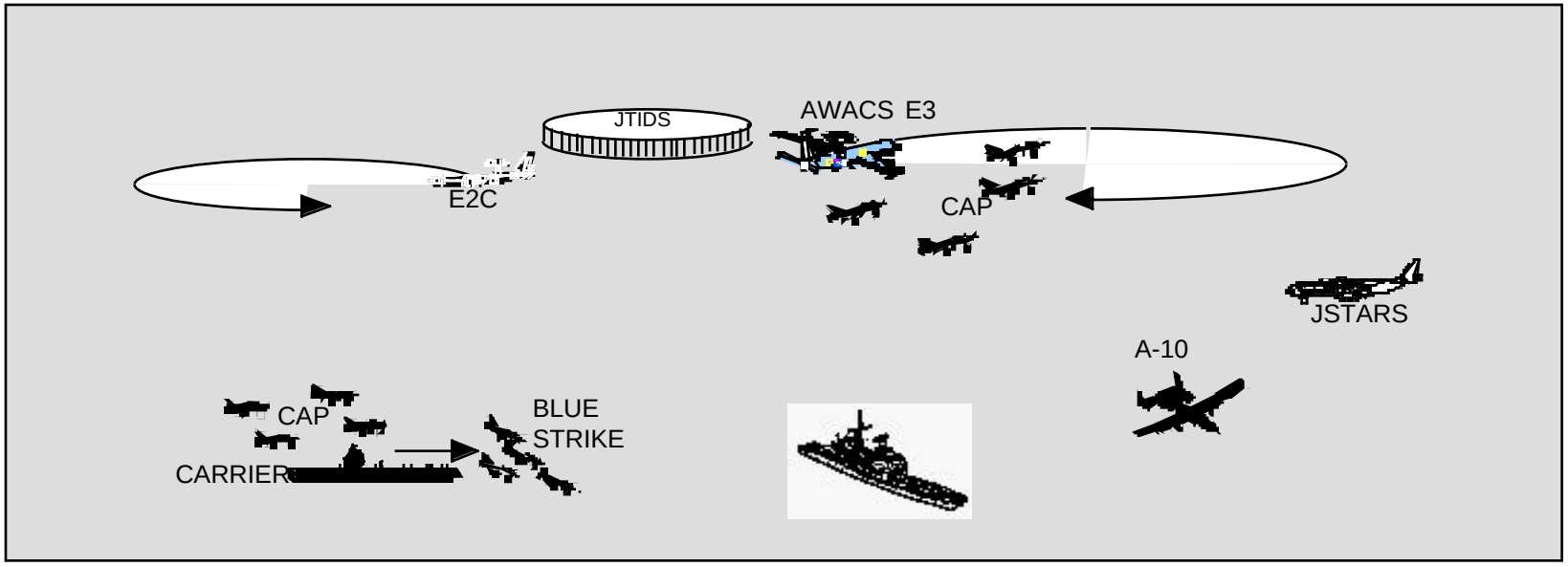
- **Pictorially Represented with "Lollipop" Chart**
- **Detailed in the Execution Environment Specification**



System Architecture Specification

Conceptual View

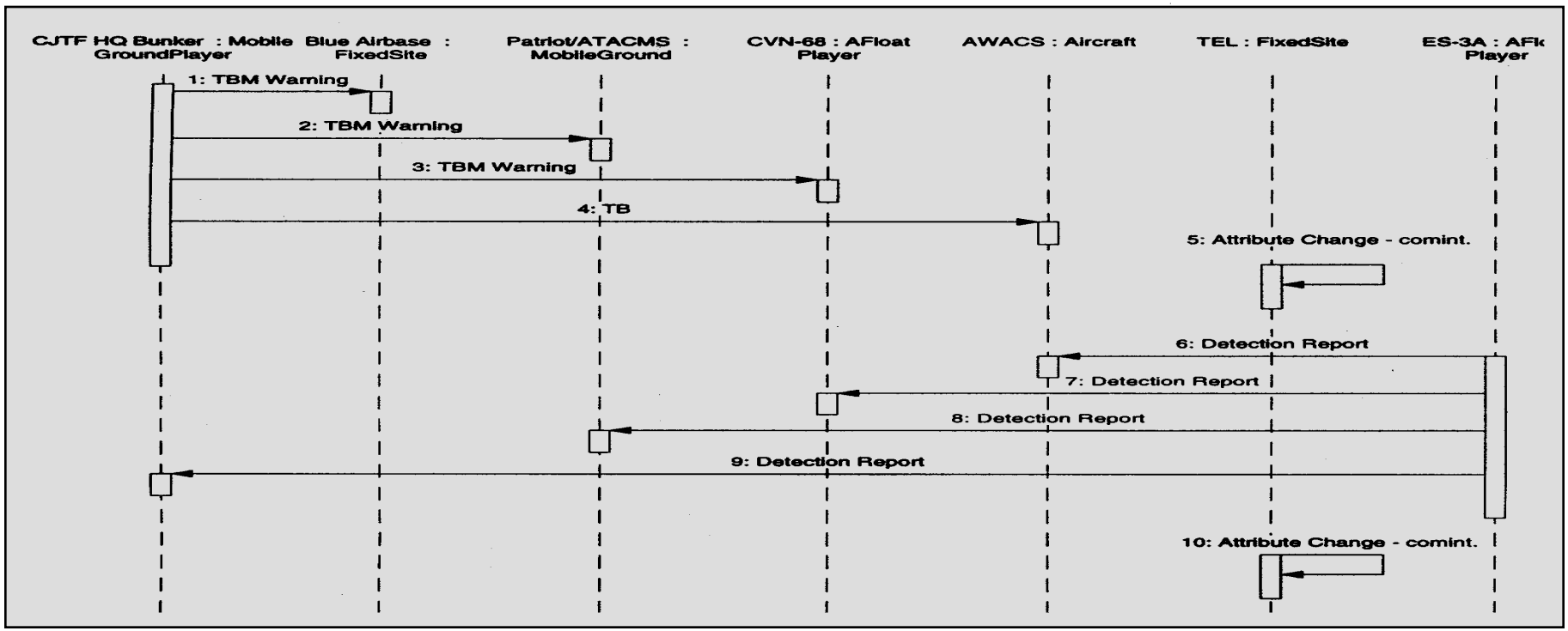
- Pictorially Represented with Battlefield Diagram
- Detailed in the Conceptual Analysis and CMMS



System Architecture Specification

Scenario View

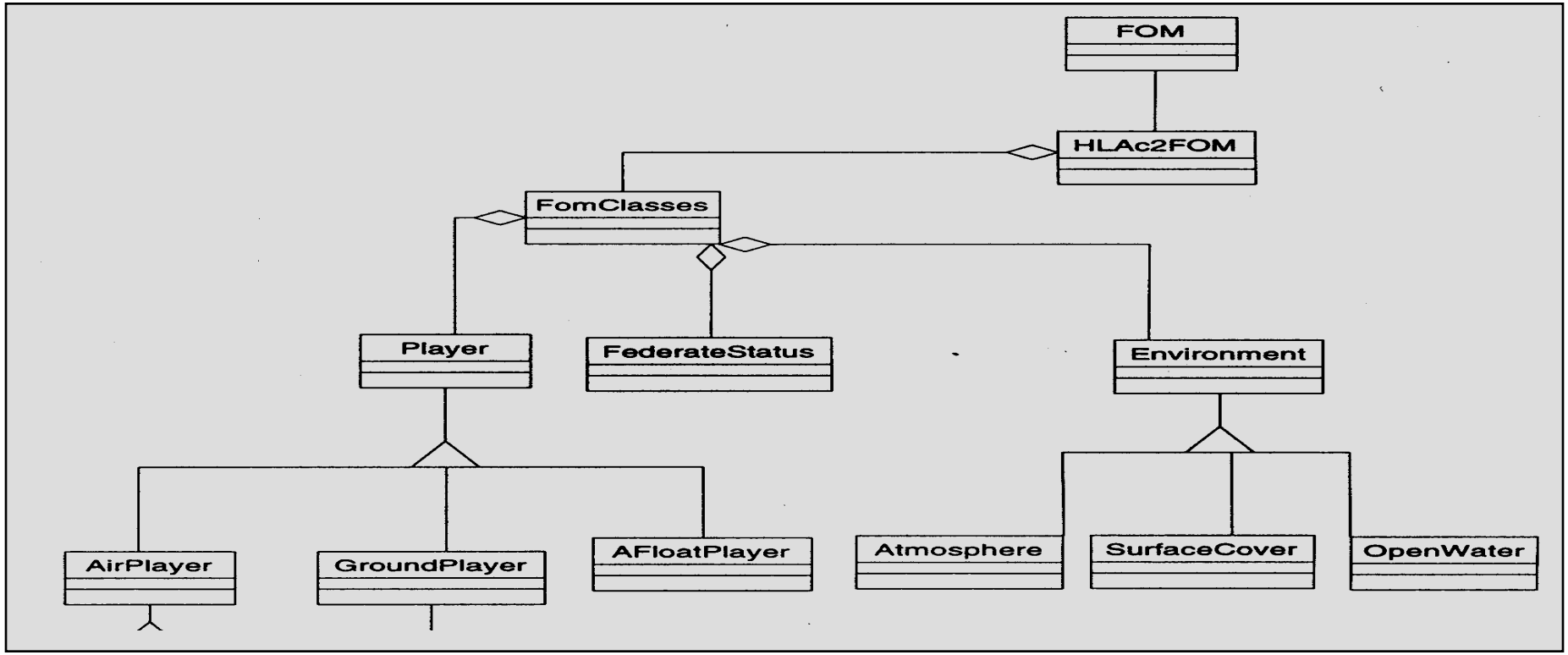
- **Pictorially Represented with Scenario Event Trace**
- **Detailed in the Scenario Specification**



System Architecture Specification

Logical View

- **Pictorially Represented with Class Diagram**
- **Detailed in the Federation Object Model**



Outline

- Experiment Overview
- Candidate Objectives
- System Architecture
- Approach
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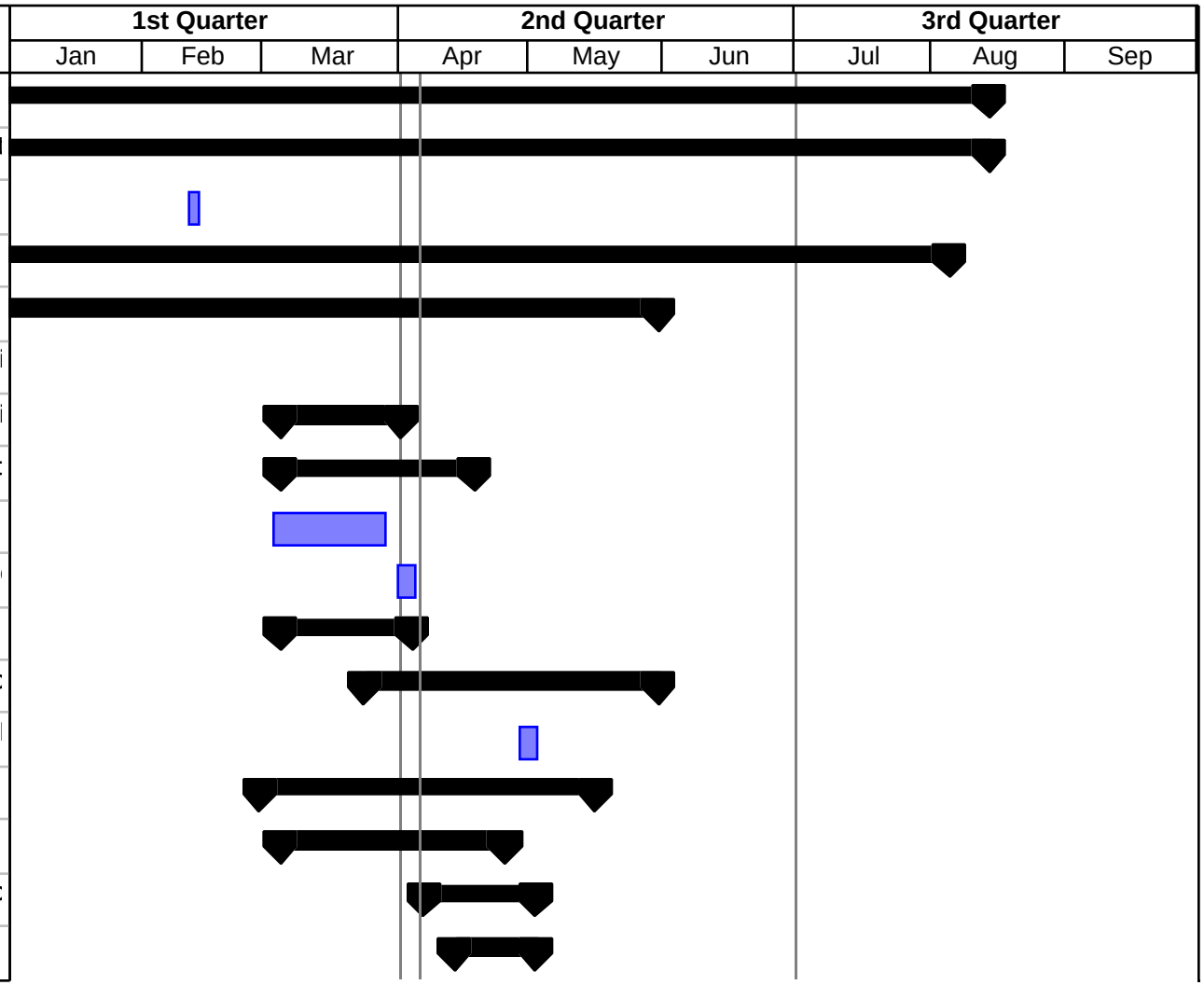
Approach

- Collaborative distributed planning, design and development using integrator to facilitate the process.
- Central integration, testing and analysis in Orlando testbed.
- Using FEDEP as high level guidance will capture actual process used and assess FEDEP guidance.

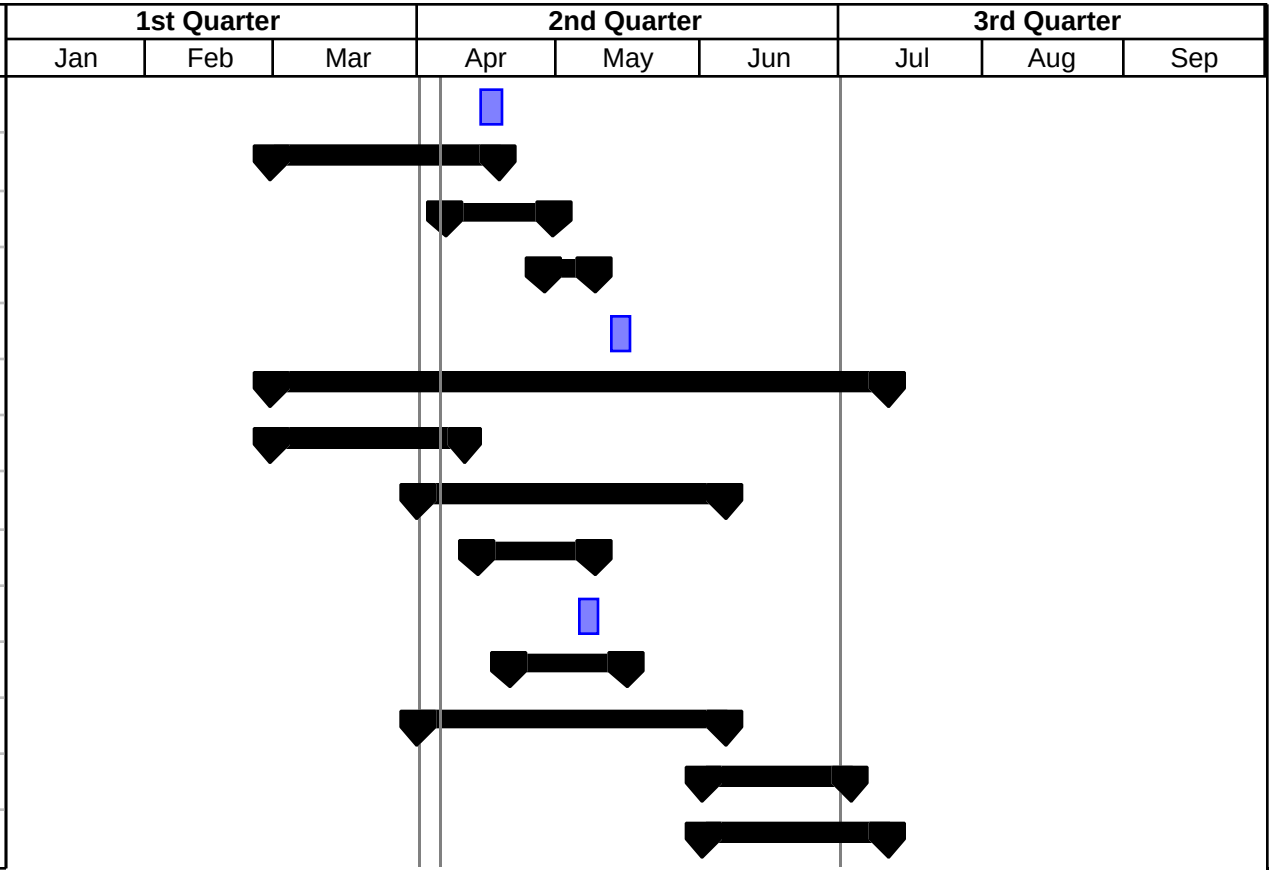
Draft Program Plan

ID	Task Name
1	**PROGRAM MANAGEMENT**
2	**Coordination with Participat**
114	**AMG Support**
118	**Ad Hoc Coordination**
136	**PROGRAM PLANNING**
137	**Federation Objectives Identi**
141	**Federation Objectives Identi**
149	**Federation Issues Identifcat**
161	Program Plan Development
162	Federation Integration Plan D
163	**Management Requirements**
168	**Test & Analysis Plan Develc**
180	Experiment /Study Plan Devel
181	**EXPERIMENT/SYSTEM DESIGN**
182	**Scenario Development**
197	**Conceptual Analysis Develc**
205	**Federation Design**



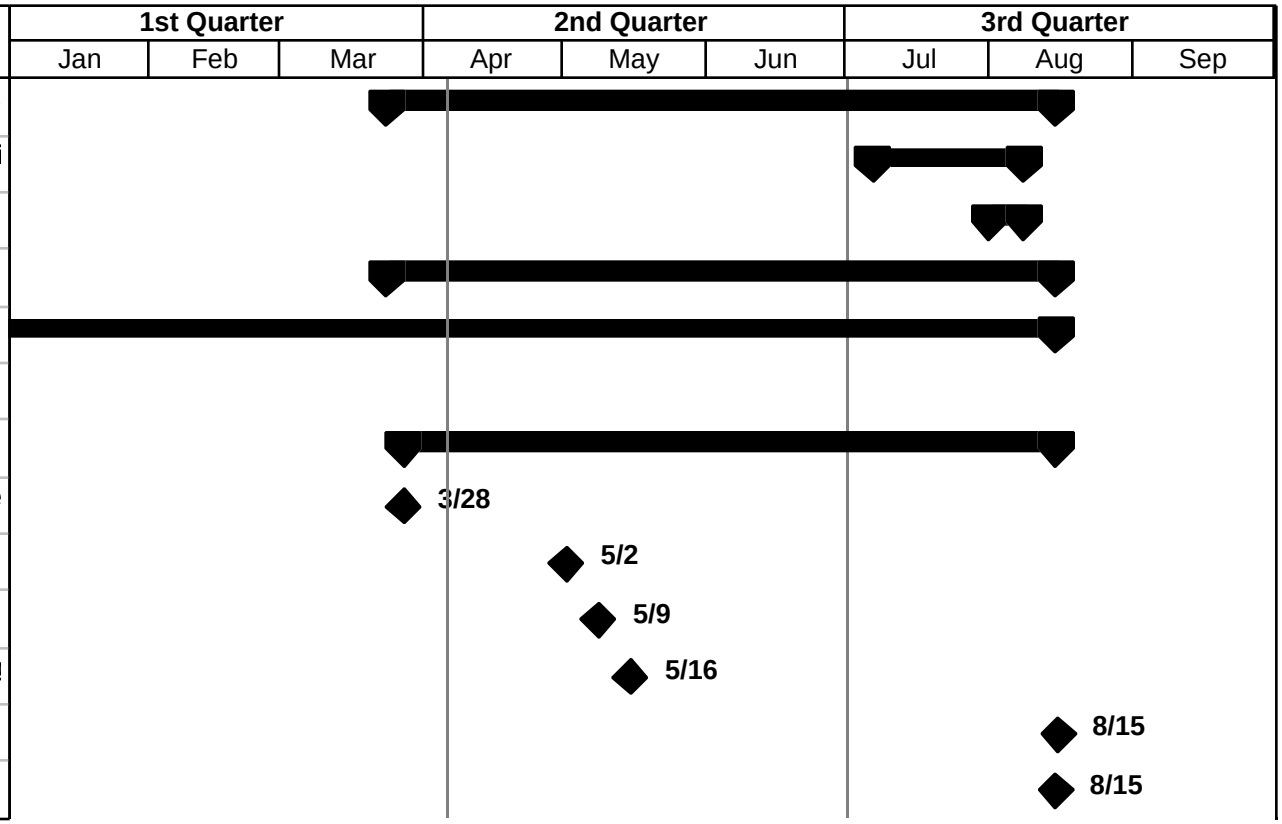
Draft Program Plan

ID	Task Name
213	Experiment/system architectu
214	**Execution Enviroment Spec**
220	**Experiment requirements id**
224	**Capture & evaluate the expe**
228	Experiment/System Design S
229	**EXPERIMENT/FEDERATION DE**
230	**H/W & S/W aquisition & con**
241	**Federation Development**
242	**Develop FOM**
255	Detailed scenario event t
256	**Scenario initialization d**
260	**Individual member fede**
288	**Federation Integration Plan**
295	**Capture & evaluate experim**



Draft Program Plan

ID	Task Name
299	**EXPERIMENT EXECUTION & RE**
300	**Federation Test and Analysi**
304	**Capture & evaluate experim**
308	**Final Report Preparation**
331	**PROGRAM MILESTONES**
332	Program Initiation
333	**Product Delivery**
334	Program Plan \ Schedule
335	Experiment/Study Plan
336	Federation Object Model
337	Experiment/System Desi
338	Final Report
339	Program Completion



Outline

- Experiment Background / Overview
- Candidate Objectives
- System Architecture
- Process/Execution Strategy
- Status / Issues

Status

- Experiment experienced approximate two month idle period as funding issues worked.
- All funding is now in place.
- Program Plan/Schedule being coordinated.
- 5 Mar 97 Technical Coordination Meeting
  - » Decided on core objectives
- 5 Mar 97 Scenario Subgroup Meeting
  - » Discussion of issues and next steps

Status

- Core objectives identified & posted
- In process of identifying technical and process related issues per objective
- Scenario specification activity in progress
- System architecture views being defined
- Execution environment specification in work
- Draft integration plan near completion

Status

- RTI F.0 installed in testbed.
- Eagle & NASM/AP integrated with RTI F.0
- H/W & S/W needs being worked
  - » ULTRASPARC installed / configured in testbed
  - » S/W needs identified
- Communications plan being worked
  - » AEgis liaisons with federates identified
  - » Will have regular reports/meetings/calls

Next Steps

- Complete Program Plan coordination
- Complete issues identification
- Complete scenario development
- Develop a conceptual analysis
- Begin federation /system design
- Begin development of Test & Analysis Plan
- Begin FOM development activity

Issues

BACKUP

SLIDES

Core Objectives

FINAL CORE OBJECTIVES SUBMITTED FOR ACCURACY REVIEW
HLA OPERATIONS / PROCESSES
· Conduct proof-of principle demonstration of HLA simulations interoperating with Real-World C4I equipment via the MRCI
· Illustrate the flexibility/efficiency of preparation & execution of HLA federations which include Real-World C4I equipment interfaced via the MRCI
· Extend the experience-base for the HLA process-model by exploring the integration of Real-World C4I aspects/components
· Provide insight/feedback on extending an existing FOM to support a new RTI
· Provide insight/feedback on the FEDEP when extending an existing federation
· Assess simulation software design philosophies with regard to Federation extension
· Assess the Federation Security Engineering Process (FSEP)
HLA & MRCI - SIMULATION REPRESENTATION, SYNCHRONIZATION AND RECONCILIATION REQUIREMENTS
· Identify extent to which adding Real-World C4I aspects to an HLA Federation levies requirements on simulations in that federation
· Demonstrate ability to read, interpret and issue appropriate C2 messages to/from MRCI for all real-world life cycle activities (planning, execution, BDA, pre-planning)
· Assess what is required to make a C2 system an HLA federate
· Assess the adequacy of the C2 data interchange format (DIF) (e.g. CCSIL)

Core Objectives

FEDERATION MANAGEMENT & TOOLS
· Evaluate utility of existing/identify possible new automated tools for HLA federations.
· Assess & provide feedback on MOM compliant Federation Controller & prospects for a reusable Federation Controller
· Demonstrate and assess use of HLA MOM features in collecting data and managing federation
FEDERATE EVALUATIONS
· MRCI Federates
>> Assess the basic premise of MRCI
>> Evaluate the extensibility and portability of the MRCI Software
>> Assess MRCI functionality
>> Evaluate the MRCI technical performance: including the effects on C4I systems and simulations
· NASM/AP
>> Assess extent to which NASM/AP insures realism of the effects of incoming real-world C2 messages on the simulation and vise versa.
>> Demonstrate the ability to have NASM/AP participate during execution of the scenario from a geographically dispersed site
· NSS
>> Demonstrate mechanism of linking NSS with real-world C2 systems using the HLA and MRCI
· EAGLE
>> Demonstrate ability to achieve seamless replacement of simulated C2 with real-world C2 (i.e. the cognitive/command decision process aspect of C2)
· JTF HQ
>> Demonstrate the utility of using the JTFHQ class object as place to implement simulation space C2 activities